ACTS & FACTS

INSTITUTE FOR CREATION RESEARCH

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JANUARY | FEBRUARY 2024

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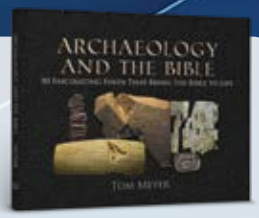

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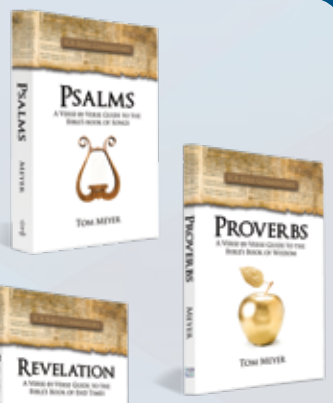

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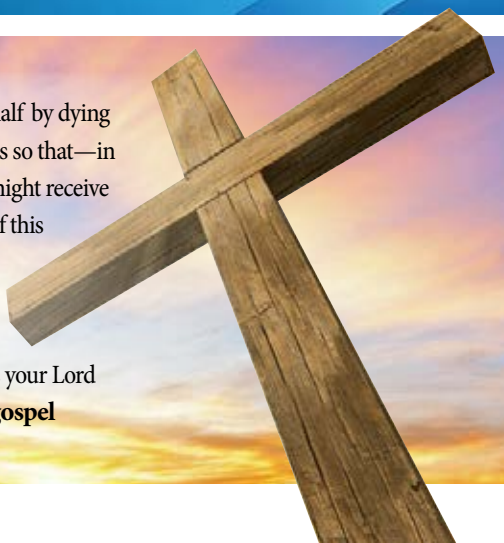

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DESIGNER
Dennis Davidson

[Jesus Christ] is the image of the invisible God, the firstborn over all creation. For by Him all things were created that are in heaven and that are on earth, visible and invisible, whether thrones or dominions or principalities or powers. All things were created through Him and for Him. And He is before all things, and in Him all things consist. And He is the head of the body, the church, who is the beginning, the firstborn from the dead, that in all things He may have the preeminence. For it pleased the Father that in Him all the fullness should dwell, and by Him to reconcile all things to Himself, by Him, whether things on earth or things in heaven, having made peace through the blood of His cross.
(Colossians 1:15–20)

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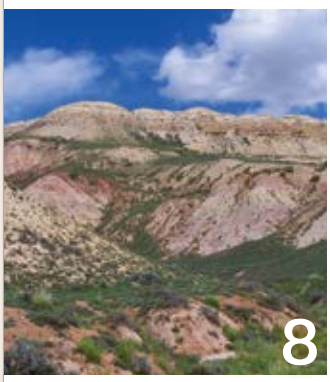

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2023

ANOTHER YEAR OF GROWTH AND OPPORTUNITY

RANDY J. GULIUZZA, P.E., M.D.

The Institute for Creation Research had a fantastic year advancing creation science in 2023! It's my joy to continue the tradition of our founder, Dr. Henry M. Morris, in using the first *Acts & Facts* 2024 issue to recount ICR's major activities and blessings from the past year. I trust you'll be excited to see the hand of the Lord Jesus empowering our progress. All credit belongs to Him, and together we can thank Him for His abiding presence and the many good things He's done.

A year ago, I discussed the new ICR logo, Digital Media department, construction for the ICR Discovery Center, and our newly completed science labs. We were able to use all of these in 2023, which turned out to be a superb year for outreach.

ICR Staff and Volunteers

Let's begin with the fabric of ICR—our people. Our full-time staff recently grew by 34%. These new personnel have filled critically needed positions. We thank the Lord Jesus for giving us wonderful folks who value being of one accord, possess outstanding skills, and place ICR's mission above self-interest. It's a delight to see our departments working together in such harmony and their people helping to carry each other's burdens. The expectation of achievement, confidence, and overall morale are extremely high.

But that's only about half the people needed to carry out our mission here. We're also blessed with a dedicated army of volunteers who deeply love ICR. All of them graciously help behind the scenes without fanfare. Most of our family of volunteers faithfully work at the ICR Discovery Center and are absolutely vital to keep it running. From our hearts, to all of them we say, "Thank you!" Our volunteers seamlessly work together with our full-time staff, who also serve as docents, speakers, or in other ways at our Discovery Center. When it comes to ICR staff, the Lord has faithfully provided for our needs according to His riches in glory (Philippians 4:19).

Educational Outreach

Why is all this teamwork important? If you were here on a daily basis, I'm sure you'd have been blessed to see over *25,000 students* learning about creation in 2023 at the Discovery Center. Our facility may be the only place where they'll be exposed to how true science confirms the Bible. With the information conveyed through our engaging exhibits, these young people are educated with answers to the ungodly messages menacing the church today. ICR content can help spare young people decades of heartache…but only if they hear it.

A major priority of our new Digital Media team is building connections with younger people. Among their many products this past year were two *Creation Classes*, four educational videos, and over 70 podcast episodes. One recent *Creation. Live* episode traces the fascinating story of a young man's journey from deep involvement in the work of militant evolutionary atheist Richard Dawkins to salvation in Christ.[1] The tragic part of his story is that he faithfully attended a conservative, Bible-teaching church throughout high school, but it never provided any teaching on evolution, Bibliology, or other topics he struggled with.

Do teens or young adults in your church know the abysmal legacy of Darwinian selectionism on humanity? This history goes back only 170 years, but its significance is lost on young people due to omission or misrepresentation in school. Our Digital Media team will make a major push in 2024 to expose the evil fruits of evolution's selectionism. Recall that in the early 20th century, the United States led the way in forced sterilizations and other atrocities to improve the "breeding stock" of humanity through a practice that selectionists called eugenics. Digital Media recently produced a powerful podcast reminding viewers of the natural selection-to-eugenics connection.[2]

ICR's educational antidote to evolutionary teaching is our School of Biblical Apologetics (SOBA). This is an online program designed as a two-year course of study with a flexible schedule in which graduates

Events team members Dave Napier (left) and Joel Kautt talk with students at the ICR Discovery Center.

can obtain up to a Masters of Christian Education in biblical education and apologetics. Minor areas of study include creation research, Genesis studies, Christian school teaching, sacred humanities, and Christian leadership and communication. During 2023, SOBA grew to over 100 active students, including 21 graduate students. You can find out more at ICR.org/soba.

As an *Acts & Facts* subscriber, you likely appreciate the efforts of our Communications team to ensure that each page is custom made. Last year, subscribers grew by over 10,000. Communications put together six regular editions, plus the history of ICR research and kids special editions. They also compile the entries for our quarterly *Days of Praise* devotional booklet, which last year surpassed 165,000 subscribers. We are blessed to continue making these materials free to all who want them…thank you! With the addition of some young and energetic new editors last year, ICR published 15 new books, developed six books scheduled for publication in early 2024, and updated 13 books for reprint.

2023 was a busy year for our Events team as well. The calendar started filling up early. One of our goals was to partner with as many different creation science ministries as wanted to work with ICR. Twelve ministries came alongside us for some of our 30 different church events in 14 states. For the young people, we conducted 15 different student events in six states and 10 campus-based events, including at the University of Missouri, Truman State University, Missouri University of Science and Technology, University of Idaho, University of New Mexico, and University of North Texas. The Discovery Center held 17 on-site events. For those who love to hike and learn, we organized five Creation Adventures in Arizona, Idaho, South Dakota, and Washington.

Research Mission

Our scientists speak at ICR events, are guests on many Christian and secular programs, and write most of the articles for *Acts & Facts*. You may be surprised to know that they also wrote 15 peer-reviewed publications for *Journal of Creation*, *Creation Research Society Quarterly*, *Proceedings of the Ninth International Conference on Creationism*, *iScience*, and *Applied Spectroscopy,* along with some theological journals.

The articles covered our major research programs, like Dr. Tim Clarey's worldwide borehole analysis detailing the progressive and multicontinental nature of the Flood, Dr. Jeff Tomkins' work correlating paleontological findings with Dr. Clarey's megasequence discoveries, Dr. Jake Hebert's work on pre-Flood longevity, and Dr. Brian Thomas' research into so-called "ancient" tissues found in dinosaur bones that are still distinctive and pliable. We also completed our third scientific expedition collecting samples, excavating dinosaur bones, and capturing footage for Digital Media.

Significantly, three papers laid the vital groundwork to fundamentally change how biological phenomena are interpreted via a new theory of biological design (TOBD). Two papers focused on ICR's engineering-based, organism-focused model of adaptation called continuous environmental tracking (CET). Perhaps the most exciting area of research is our related science experiments on blind cavefish. This is our biggest science initiative in over two decades, and I believe it is ICR's most important work to date. Our findings are already influencing other research organizations to do additional work on TOBD.

We now have four microscopes, including the Zeiss confocal laser scope, in our microscopy lab. In 2024 we hope to add a polarized light-refracting scope that will be able to identify and image soft tissue in thin sections of dinosaur bone. Our molecular lab is just about fully stocked, and we're looking to add an additional lab technician.

That covers many of the highlights for 2023—what a year it was! It's exciting to see the hand of the Lord Jesus empowering ICR's progress for creation science. Dr. Henry Morris used to always add that "ICR finished the year in the black." So, our deep "thank you" that we're able to say the same, and also to the many *Acts & Facts* readers who regularly pray for ICR in their daily devotions. We need the Lord Jesus to help us have scientific insights, creativity in our communications, and spiritual protection for the ICR family. We look forward to working together with you in 2024.

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Dr. Guliuzza is President of the Institute for Creation Research. He earned his Doctor of Medicine from the University of Minnesota, his Master of Public Health from Harvard University, and served in the U.S. Air Force as 28th Bomb Wing Flight Surgeon and Chief of Aerospace Medicine. Dr. Guliuzza is also a registered Professional Engineer and holds a B.A. in theology from Moody Bible Institute.

JANUARY 7, 14, 21, 28

Carrollton, TX

Valley View Christian Church

Grow Class

A 4-week series on creation and the global Flood

(T. Clarey, B. Thomas, D. Napier)

214.615.8325

JANUARY 20-21

Washington, IL

Bethany Community Church

Uncovering the Truth About Creation

(F. Sherwin, D. Napier, E. Steele)

ICR.org/WashingtonIL or 214.615.8306

FEBRUARY 10

Rocklin, CA

Jessup University

Genesis Apologetics Conference

(R. Guliuzza)

GenesisApologetics.com or 844.743.6374

FEBRUARY 11

Carlsbad, CA

The Mission Church

(R. Guliuzza)

ICR.org/CarlsbadCA or 214.615.8333

FEBRUARY 23-25

Dozier, AL

Good News Baptist Chapel

Uncovering the Truth About Creation

(F. Sherwin)

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SAVE THE DATE

APRIL 6, 2024

Forney, TX

First Baptist Church

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ICR.org/Eclipse2024 or 214.615.8325

JANUARY 20

Dallas, TX

ICR Discovery Center

Made in His Image Seminar

(R. Guliuzza)

In celebration of the sanctity of human life

ICRDiscoveryCenter.org/Special-Events

JANUARY 30–FEBRUARY 1

Dallas, TX

ICR Discovery Center

Homeschool Days

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SAVE THE DATE

MARCH 2

Dallas, TX

ICR Discovery Center

Everlasting to Everlasting Conference

ICR's Dr. Randy Guliuzza and
Col. Tim Moore of Lamb & Lion Ministries

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APRIL 26-28

Dallas, TX

ICR Discovery Center

***Get Bold!* Student Conference (grade 8 through college)**

Carl Kerby of Reasons for Hope* and
Bill Jack of Worldview Academy

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MARCH 12-16

Dallas, TX

ICR Discovery Center

Dinosaur Week

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JUNE 11-14

Dallas, TX

ICR Discovery Center

Christian Educators' Conference

Mike Riddle of
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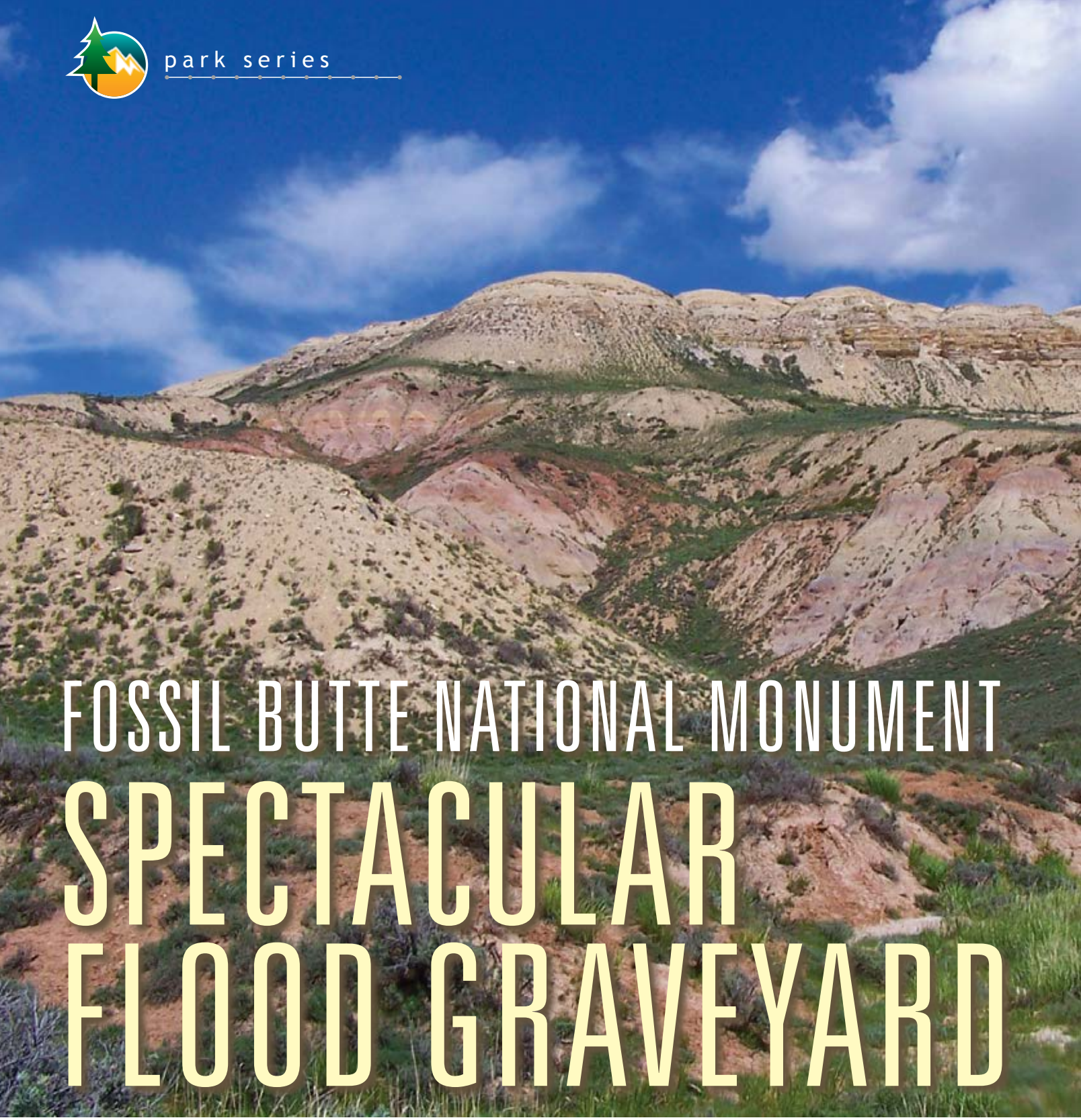
Kyle Mann, Babylon Bee's Editor in Chief, speaks at the ICR Creation Mega Conference in Phoenix, Arizona

RECENT EVENTS

ICR's October Grand Canyon tour

ICR's 2023 science expedition team at Wyoming's Lake Marie (L-R): Davis J. Werner, Dr. Jeff Tomkins, Dr. Tim Clarey, Dr. Randy Guliuzza, and Clint Loveness

Please check **ICR.org/events** for the most up-to-date event information. If you have questions about a specific event, please send an email to **events@icr.org** or call **800.337.0375** and press 6.



FOSSIL BUTTE NATIONAL MONUMENT

SPECTACULAR FLOOD GRAVEYARD

TIM CLAREY, PH.D.

Southwestern Wyoming contains one of the most unique fossil sites in the world—Fossil Butte National Monument. Located about 11 miles west of Kemmerer, it was established as a national monument on October 23, 1972.[1] The park encompasses about 13 square miles and contains several buttes, or flat-topped hills.

These landforms expose a rock layer known as the Green River Formation (GRF) and its diverse fossil assemblage, often called a Lagerstätte.[2] The GRF is best known for its fish fossils, but it includes many other fossil types, as well. Most of these fossils are found in the Fossil Butte Member, a section of the formation that measures about 200 to 260 feet thick.[3]

People have collected fossils on private land in the surrounding

Fossil Butte. The white layer on the top represents the Green River Formation's limestone. The red layer and cream-colored beds below are the Wasatch Formation.
Image credit: National Park Service

article highlights

- The Green River Formation of Wyoming's Fossil Butte National Monument is chock-full of fossils.
- The formation is composed of marine sediments that fresh-water lake scenarios can't explain.
- A wide variety of reptile, mammal, bird, and marine fossils are mixed together in the formation—a clear indication of rapid, catastrophic burial.
- This vast fossil graveyard is yet more evidence of the Genesis Flood.

Fossil herring called Knightia. *It's the most common vertebrate fossil in the world because of the Green River Formation. Note the multiple thin layers; each of them contains a fossil.*
Image credit: Tim Clarey

ICR's 2023 science expedition team (L-R) Drs. Tim Clarey, Randy Guliuzza, and Jeff Tomkins show off their fossil catches.
Image credit: Clint Loveness

area for over a century. At one of these sites, a team of ICR scientists including myself excavated fish fossils from the Fossil Butte Member. We observed many fossilized fish species, especially *Knightia,* a type of small herring that's the most common fish in the GRF. It also serves as Wyoming's state fossil.

Conventional scientists claim the GRF represents an ancient

The ICR team uncovered numerous fossils in the formation's limestone layers.
Image credit: Tim Clarey

A long day's work at the rock pile during the ICR science expedition
Image credit: Tim Clarey

freshwater lake. However, four observations indicate this rock unit was deposited by the global Flood and influenced by marine conditions: 1) the immense size of the formation, 2) the presence of oceanic sediments, 3) the mixture of land and marine fossils, 4) and the evidence of rapid, catastrophic burial of the fossils.

Extensive Flood Sediments

The first observation involves the extent and thickness of the Green River Formation. Composed primarily of limestone, the GRF is about 2,000 feet thick and covers 20,000 square miles of the Greater Green River Basin. Below the formation lies another 23,000 feet of Flood rocks that in total contain five of the six megasequences.[4] The GRF is included in the last megasequence, the Tejas, which represents the Flood's receding phase.[4]

Every basin, or depression, between the mountains of Wyoming is filled to the same level with Flood rocks. The topmost layers are identified by conventional geologists as Eocene. Although separated by mountains and uplifts that were still actively rising during the Flood, the similar nature of these rocks across all of the Wyoming basins suggests a common origin.

Exposed sediments known as the Wasatch Formation, for instance, are easily identified by their red and cream-colored, clay-rich layers. The GRF intermingles with these beds as a lens of lime-rich sediments in the Green River Basin's center.[5] Conventional geologists claim the Wasatch Formation was formed by rivers draining from the surrounding uplifts while the GRF was a freshwater lake in the middle.

However, a better explanation for these two layers is that both were deposited by the Flood. And that's also why we find nearly the same rock progression in every basin. The Flood deposited each succeeding megasequence as the water advanced upward. As the water receded, it eroded tremendous volumes of freshly deposited sediment off the rising mountains and washed them into the Wyoming basins. This process provided the material for the topmost Eocene layers—including the GRF.

Marine Sediments in the Green River Formation

The presence of oceanic sediments also indicates a Flood origin for the Green River Formation. As I mentioned earlier, the GRF is mostly composed of limestone. This type of rock is indicative of a marine environment—especially since it's a fine-grained variety called micrite, which usually precipitates in seawater. In addition, the GRF contains oolites, rounded tiny balls of carbonate rock that form in warm oceans, as well as the carbonate mineral dolomite in some layers. Dolomite only forms in very special types of seawater today. These carbonate-rich units also contain molds of dissolved salt crystals, another indicator of saline conditions at the time of deposition.

Furthermore, the GRF holds several beds of oil shale. The origin of this rock is attributed to the rapid burial of phytoplankton, blue-green algae, zooplankton, bacteria, pollen, and spores.[5] Crystals of dolomite and calcite are also found in the oil shale.[5] It's not a typical

clay-rich shale but a dolomitic marlstone (clay and carbonate mix) that's rich in organic matter.[5] Compaction and heat caused chemical reactions that changed the organics into a petroleum product, allowing the rock to burn. These data strongly indicate the GRF was deposited under marine conditions.

Mixed Land, Freshwater, and Marine Fossils

The Green River Formation contains a tremendously diverse collection of land, marine, and freshwater animals and plants. Collectors have discovered fossils of complete crocodiles, snakes, turtles, lizards, palm trees and fronds, cattails, ferns, bamboo, shrimp, crayfish, spiders, dragonflies, bees, ants, several types of birds, lemur-like mammals, bats, a tapir, and small horses. Discoveries also include fish such as stingrays, rays, herring, sardines, perch, sandfish, and gars. By far, however, the most common fossil is the herring *Knightia*. In fact, the University of Wyoming Geological Museum heralds it as the most common vertebrate fossil in the world!

Despite the oceanic evidence, conventional scientists stubbornly try to force these discoveries into their preconceived ideas of a freshwater lake environment. Signage at the Royal Tyrrell Museum in Alberta, Canada, states, "Modern herring live in salt water, but close Eocene relatives were abundant in the fresh water lakes of western North America."[6] A second display features a spectacularly preserved fossil of a ray and claims, "Rays are rarely preserved as fossils, in part because their skeletons are made of cartilage rather than bone. Most rays prefer salt water, making this fresh water form an even more remarkable fossil."[6]

But the rocks and fossils don't lie. A better explanation is that this remarkable assemblage of fossils, likely representing the diversity of life in the pre-Flood highest hills, was washed into the Green River Basin by massive waves as the floodwater began to recede.

Palm frond fossil
Image credit: National Park Service

Rapid Burial and Spectacularly Well-Preserved Fossils

Finally, in the Green River Formation we observe evidence of rapid and continuous burial conditions. Most of the formation's fossils are fully articulated, and many of the creatures appear to have been buried alive. Complete fish and animal fossils have been found in thin limestone layers that are just fractions of an inch thick. The lime likely rained down through the chemically mixed water, encasing the fish while they swam. As one publication states:

> It would seem that rapid burial might be the most obvious reason for excellent preservation. Thus any factor or combination of factors that would cause rapid precipitation of carbonates [limestone and dolomite] and also would cause the mortality of fish would satisfy our requirements.[5]

Indeed, the Flood provides the best solution. ICR scientists have determined that the Flood's receding phase formed the Tejas Megasequence,[6] which contains the Green River Formation. All the observations—including the thickness and extent of the GRF, the marine sediments within, the fossils from mixed environments, and the evidence of rapid burial—support the global Flood's formation of this massive fossil graveyard.

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Dr. Clarey is Director of Research at the Institute for Creation Research and earned his Ph.D. in geology from Western Michigan University.

JEFFREY P. TOMKINS, PH.D.

Small Heritable RNAs Pack a Big Adaptive Punch

DNA methylation

article highlights

- Scientists have discovered a powerful epigenetic system in which very small heritable RNA molecules affect the development of an organism's offspring.
- Three classes of small RNAs—siRNAs, miRNAs, and piRNAs—not only perform key regulatory functions but can also be transmitted in sperm and egg cells to the resulting embryo.
- Environmental cues can trigger specific patterns of small RNAs in an organism that can give its offspring a jump-start on adaptation.
- These tiny molecules are part of the irreducibly complex cell systems that enable creatures to thrive from one generation to the next. They testify to the brilliant engineering of their Creator, Jesus Christ.

In a previous article, I explained how epigenetic mechanisms regulate the structure and function of DNA.[1] Specifically, I showed how small molecules can be attached to the DNA itself or added to the histone proteins that the DNA is packaged with. These are known as DNA methylation or histone modifications, respectively. The modifications are monitored and performed dynamically according to the needs of the cell and adaptively in response to environmental changes. Furthermore, these epigenetic modifications can be heritable to give the organism's offspring an adaptive advantage.

In addition to DNA methylation and histone modifications, scientists have discovered a powerful epigenetic system that operates on top of the genetic code in a very different way from being chemically attached to the chromatin itself (DNA complexed with histones is called chromatin). This amazing epigenetic paradigm is associated

with very small RNA molecules that are heritable and that profoundly and adaptively affect the development of an organism's offspring.

The Search Engine of the Genome

One of the best ways to describe how small RNAs work in the cell is to use the analogy of an internet search engine. When a search engine is pulled up in your web browser, you can type in a small bit of text, hit enter, and then get a hit wherever the text matches up. For example, you could enter "for God so loved the world," and it would immediately pull up the Bible verse John 3:16.

Cells also have powerful search engines that are specialized protein machines. These protein machines take a small 22- to 30-letter piece of RNA as their search engine input, which is a string of nucleotide text associated with part of a specific gene in the genome. The small piece of RNA binds to a specialized protein, and then off it goes to find a match. When a match is made to a corresponding piece of code, the gene itself or even the RNA product of the gene is bound by the RNA-protein complex, silenced, and turned off.

What is even more amazing is that these little RNAs can also be transmitted in the sperm and egg and affect the development of the resulting embryo.[2,3] The effects of these small, heritable RNAs can persist in an organism's offspring for up to four generations. Furthermore, environmental cues detected by an organism can trigger specific patterns of small RNAs that will heritably prime the future offspring for a jump-start on adaptation.

While their function is similar, the search engine capacities in the cell are considerably more advanced and variable than internet search engines. The specific type of the small RNA-based search engine scheme has three main systems: RNA interference (RNAi, also called small interfering RNA or siRNA), microRNA (miRNA), and piwi-interacting RNA (piRNA). I will discuss each system briefly and then review their importance as cleverly engineered adaptive control systems.

Trypanosoma cruzi *parasite*

The RNA Interference System

Scientists have known since the 1980s that the injection of RNA molecules into cells corresponding to certain genes of interest can affect their expression levels, even silencing the genes. Surprisingly, this can be achieved using either a sense or anti-sense form of the RNA molecule.[3] In the late 1990s and early 2000s, it was shown that the injection of double-stranded RNA molecules corresponding to specific genes into the cells of trypanosomes (single-cell eukaryotic parasites), plants, fruit flies, and mammals could cause the specified genes to be silenced.[3]

Researchers then began to genetically dissect and examine the proteins involved in this mysterious cellular process. In this pathway, known as RNA interference (RNAi), one of the key players is a piece of protein machinery called an RNA-dependent RNA polymerase that makes RNA copies based on an RNA template.[3] Additionally, many other components of the "RNAi machinery" were identified and documented in plants, invertebrates, and vertebrates.[3]

The RNAi pathway as we currently understand it can be described in the following simplified model. The double-stranded RNAs in the cell are recognized and bound by a group of proteins called double-stranded RNA binding proteins. These then interact with an enzyme called dicer that chops the double-stranded RNAs into small pieces that are about 20 to 23 nucleotides long. These small RNAs are copied and amplified by the RNA polymerase mentioned above and can then act as small interfering RNAs or siRNAs.

These newly copied RNAs are unwound, and one of the two strands acts as the guide RNA or search engine input, as mentioned earlier. This RNA is loaded into the search engine mechanism, which is a protein machine called the RNA-induced silencing complex, or RISC. The RISC complex finds a complementary RNA that matches the guide RNA and cleaves it with the assistance of an Argonaute protein, which is the catalytic component of the RISC complex. The end result is that messenger RNAs are selectively targeted, degraded, and removed—effectively silencing the products of specified genes.

Argonaute protein

Since there are a range of RNAi pathways and many variants in the RISC complex and Argonaute proteins, these systems in the cell operate at several different levels. In plants, insects, and vertebrates, RNAi mechanisms are known to directly influence the methylation of DNA in the genome. In a previous article, I explained how the addition of methyl tags on the cytosine molecules in DNA can either shut down or activate genetic activity.[1] At present, it's believed that the RISC complex can recruit the methylation machinery (methyltransferase enzyme) and that the guide RNA provides the targeting specificity.

Both small RNAs and epigenetic states in the DNA are dynamically produced based on environmental cues detected by the organisms. Furthermore, these factors can be inherited over several generations. Thus, the potential effect of priming future generations of creatures to have an advantage in adaptation is profound. This adaptive effect begins during the development of the embryo and is regulated by both small RNAs and epigenetic states. In this respect, siRNAs play important roles in not only organism development but also stress responses, pathogen interactions, DNA damage repair systems, and 3-D chromosome structure in the nucleus.

In another article, I showed how transposable elements (TEs) are key, designed features of the genome that provide a host of functions in adaptation.[4] Not surprisingly, there is a strong connection between TEs and siRNAs. As it turns out, many siRNAs are encoded by sequences within transposable elements. Conversely, many siRNAs also regulate the activity and expression of sequences within TEs. In addition, siRNAs have been found to regulate the overall activity of TEs, including their transposition (movement in the genome).

MicroRNAs

MicroRNAs (miRNAs) are another class of small, non-coding RNAs that play a large and important role in regulating gene expression in the cell.[5] The majority of miRNAs are copied (transcribed) from DNA sequences into long primary miRNAs, processed into precursor miRNAs, and then finally processed into mature miRNAs that are about 19 to 25 nucleotides long. In most cases, miRNAs interact with the tail end of a targeted, long protein-coding RNA in a region called the 3′ untranslated region (3′ UTR). This miRNA targeting often results in the target mRNA's degradation or its repression from being used to create a protein. However, the interaction of miRNAs with other regions of an RNA transcript, including its leader sequence (called a 5′ untranslated region), is also being documented.

While most miRNA action occurs outside the nucleus of the cell by regulating the translation of RNAs in the cytoplasm, some miRNAs can also regulate transcription of genes in the nucleus.[5] This interaction of miRNAs with their target genes on chromosomes is a dynamic process that depends on many factors, including the quantities of both the miRNAs and the target mRNAs being transcribed. And since the targeting of miRNAs to an mRNA contains a measure of imperfect binding, the affinity of the miRNA-mRNA interaction also plays an important role.

Not only do miRNAs function in the cell, but they can also be secreted outside the cell in specialized lipid capsules called vesicles.[5] These are suspended in extracellular fluids and transported to target cells in other parts of the organ or body. In this role, extracellular miRNAs function as specialized chemical messengers that mediate cell-to-cell communication systems.

While miRNAs play a huge role in the biology of individual organisms, they are also heritable in both egg and sperm and thus play a major role in embryo development and the expression of adaptive traits in the next generation. In this respect, a 2021 study revealed new insights into the role of mRNAs and miRNAs in host gut tissue functions in Japanese quail.[6] The study found that miRNAs played a major role in gut phosphorus utilization and other related traits in terms of the genetic regulation and inheritance of gut-related gene expression in a complex association with gut microbiome components. In other words, the inheritance of specific miRNAs gave offspring a jump-start on exploiting nutritional components of the bird's environmental food supply.

Another study showed that sperm miRNAs in mice restructured early embryonic gene expression profiles during the development of core neuronal circuits, which affected mental health to create depression-like behaviors.[7] Overall, the findings revealed that sperm miRNAs play a causal role in the inheritance of depression. The study results not only provide insight into a possible mechanism underlying susceptibility to depression but also into the important role small RNAs play in epigenetic heritability, a factor that significantly impacts the course of embryonic brain development.

Piwi-Interacting RNAs

Piwi-interacting RNAs (piRNAs) are a fairly recently discovered

group of small RNAs that are 26 to 30 nucleotides in length and bind to a class of biomolecules called Piwi proteins.[8] These short RNAs were originally discovered in germ-line cells (leading to sperm and egg cells) but are now also being found to be important genome regulators in many other bodily cells (somatic cells). These small RNAs are biologically significant because they regulate gene expression, transposable element (TE) activity, epigenetic programming, DNA rearrangements, gene transcript production, and translational control (protein production) of gene transcripts in the cytoplasm.[8] A large body of research is revealing that the dysregulation of piRNAs can cause epigenetic changes that contribute to diverse health issues such as cancer, heart disease, nervous system disorders, retinal disease, and reproductive system problems.[9]

Illustration of human conception

A large proportion of piRNAs are produced from specialized genetic regions on chromosomes called piRNA clusters.[8] While these regions provide the genetic information to code for multiple piRNAs, the entire cluster is controlled as if it were a single gene. A large mRNA is copied from the cluster, and the resulting transcript is processed into individual piRNAs that are then bound to Piwi proteins. Some of these piRNAs work in the cell's nucleus to recruit and direct DNA methyltransferases to methylate cytosines[1]—a form of epigenetic modification of DNA that downregulates genes or silences the activity of TEs. Other piRNAs do their work in the cell's cytoplasm to regulate the translation (making of a protein from messenger RNA) of specific genes.

Clearly, these piRNAs are yet one more regulatory feature of an organism's response to dynamically adapt to its environment and regulate the activity of the genome. Furthermore, these piRNAs are intimately connected to the embryonic development of an organism, where they regulate the activity of TEs. In fruit flies, piRNAs have been shown to be intergenerationally inherited through the maternal lineage.[9] In this respect, the piRNAs specify TE locations on chromosomes in the developing embryo to be silenced. These maternally inherited piRNAs enter somatic cell nuclei in early embryonic development and persist in their activity for roughly half the time required to complete embryonic development.

Conclusion

Small RNAs occur in a variety of forms and play a central role in gene and genome regulation. Three specific classes of small RNAs—siRNAs, miRNAs, and piRNAs—are of particular interest in studying heritable adaptive mechanisms. These small RNAs are not only expressed and utilized by organisms to control their adaptation and healthy biological stasis, but they can also be transmitted in the sperm and egg cells to give the developing embryo a jump-start on adaptation.

These amazing little molecules are just one more component of the irreducibly complex systems in the cell that not only make life possible but enable creatures to thrive and fill the earth according to the grand design of the Creator who engineered them, the Lord Jesus Christ.

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Let my teaching drop as the rain, My speech distill as the dew,
As raindrops on the tender herb, And as showers on the grass.

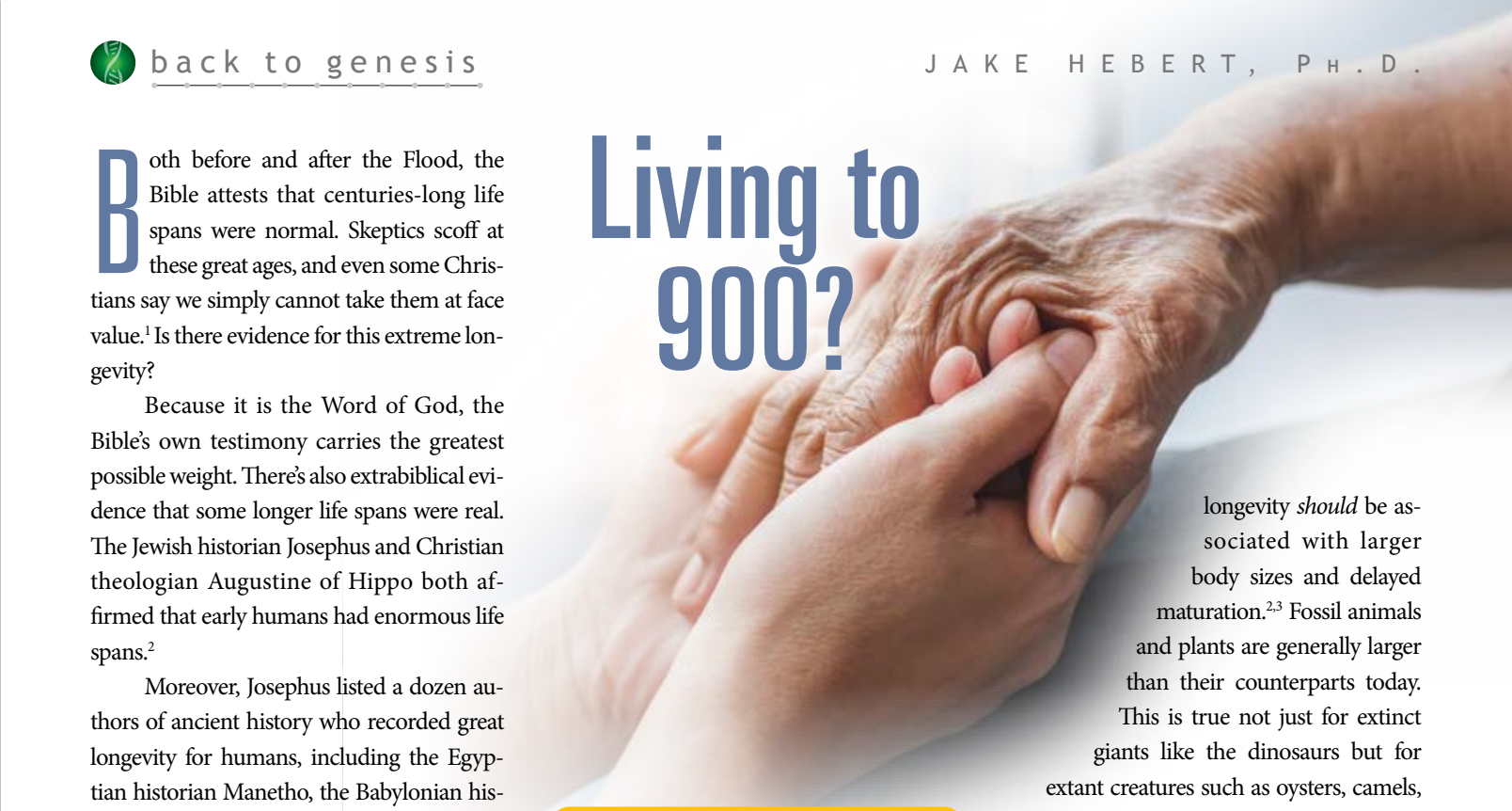
DEUTERONOMY 32:2

Thale cress ***(Arabidopsis thaliana)***

Image credit: Micrograph captured and edited by Michael J. Boyle, Ph.D., The William B. Dean, MD Imaging Center of the Institute for Creation Research

JAKE HEBERT, PH.D.

Living to 900?



Both before and after the Flood, the Bible attests that centuries-long life spans were normal. Skeptics scoff at these great ages, and even some Christians say we simply cannot take them at face value.[1] Is there evidence for this extreme longevity?

Because it is the Word of God, the Bible's own testimony carries the greatest possible weight. There's also extrabiblical evidence that some longer life spans were real. The Jewish historian Josephus and Christian theologian Augustine of Hippo both affirmed that early humans had enormous life spans.[2]

Moreover, Josephus listed a dozen authors of ancient history who recorded great longevity for humans, including the Egyptian historian Manetho, the Babylonian historian Berosus, and the Greek poet Hesiod. Although their works containing this information have apparently been lost, the fact that Josephus cited them shows that knowledge of extended life spans was widespread in the ancient world.

Augustine not only affirmed that people before the Flood (antediluvians) lived to great ages but also that they were larger than we are.

> ...observed how prolonged were the lives of men, unless some skeptic take exception to this very length of years which our authors ascribe to the antediluvians and deny that this is credible. And so, too, they do not believe the size of men's bodies was larger than now.[2]

Indeed, cultures from around the world affirm that antediluvian people lived longer and were possibly bigger than people today. As part of my current research, I am in the process of compiling a list of these traditions. Although not all creation scientists agree that early humans were larger than humans today, hints in the Bible and fossil record lend plausibility to that scenario.

Additionally, some evidence indicates that slower rates of maturation are associated with longer lives and larger body sizes. The earliest age at which a Genesis 5 patriarch is listed as having a son is 65. While we don't know for certain, it seems likely that at least some of the sons listed in the Bible's early genealogies were firstborn.

So, were antediluvians undergoing puberty in their teenage years but deciding to wait 50+ years to have children? That seems extremely unrealistic. Another explanation needing consideration is that it took much longer for antediluvians to become mature compared to humans today.

Years ago, creation researchers Don Patten and Greg Beasley deduced that great longevity *should* be associated with larger body sizes and delayed maturation.[2,3] Fossil animals and plants are generally larger than their counterparts today. This is true not just for extinct giants like the dinosaurs but for extant creatures such as oysters, camels, kangaroos, and penguins.

Scientific literature includes evidence that at least some fossil creatures were larger, took longer to mature, and lived longer than their present-day descendants.[4] Given this linkage between body size, longevity, and rate of maturation, it's possible this was also generally true for pre-Flood and immediate post-Flood people, animals, and plants.[5]

It's no surprise that ICR's new research tends to confirm the accuracy of the Genesis record as plainly understood since it is the testimony of the Creator Himself, the Lord Jesus Christ.[6] As our late president Dr. John Morris loved to say, "It's a great time to be a Bible-believing Christian!"

article highlights

- Genesis mentions people living extraordinarily long lives—some over 900 years.
- Historical sources outside the Bible record that early humans had long life spans.
- Fossils show evidence that at least some animals lived longer, matured more slowly, and were larger than today's animals. Likewise, early humans may have matured more slowly and been larger than today's humans.
- ICR's research continues to support the Bible's remarkable record of early human history.

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BRIAN THOMAS, PH.D.

DNA Repair

The Built-in Toolbox That Sustains Life

article highlights

- DNA holds the intricate genetic blueprint for every creature.
- This DNA is vulnerable to incessant damage and requires constant precision repair.
- Robot-like enzymes detect damage and snip, weld, and/or reposition the damage exactly when and where repair is needed.
- Darwinism says mutations help drive evolution, but these complex DNA repair systems prevent the very mutations the evolutionary model requires.
- DNA and its built-in repair mechanisms had to have been created at the same time since they need each other to exist. This points to the forethought and craftsmanship of our Creator, Jesus Christ.

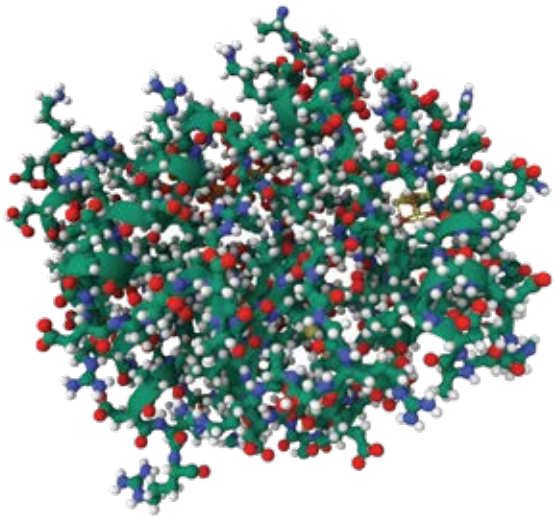
DNA contains the instructions needed to build a whole body from one fertilized egg cell. Chromosomes consist of double-stranded DNA that uses specifically paired nucleotides in precise sequences to encode this information. Our Creator selected four nucleotides for this, with each pair comprising a "rung" in the long, ladder-like biomolecule.

In today's sin-wrecked world, factors like certain chemicals, rogue electrons, radiation, and rare copying errors constantly assail DNA.[1] The DNA in each cell suffers tens of thousands of damages each day.[2] Without intervention, it wouldn't take long for a lethal number of errors to accumulate. How does our DNA survive such overwhelming damage?

God expertly outfitted all living cells in the beginning with the required tools to keep DNA's coded information pristine. Life depends on DNA repair pathways. Every cell in organisms from germs to geraniums constantly uses them. Molecular and cell biologists have used clever techniques to peer into the inner workings of cells, revealing multiple ingenious tactics that repair DNA.

DNA repair pathways use dozens of enzymes. Each enzyme performs a specific biochemical reaction over and over like a molecular robot. Uracil-DNA glycosylase, shown below, is one such enzyme. It helps remove and replace uracil, a nucleotide that belongs in RNA but can mistakenly enter DNA.[3]

Some DNA repair strategies use enzymes called helicases to unwind DNA to allow yet more enzymes access to problem areas. An-



Crystal structure of Uracil-DNA glycosylase bound to a short segment of DNA. Each sphere represents the position of an atom among its 208 amino acids.

Image credit: Rendered from PDB ID: 6AJO, CC0 1.0 Universal Public Domain Dedication

other enzyme snips out not just one nucleotide but whole offending sections. It then signals proteins to bring the correctly matching DNA base into position. Like precision robot welders, these enzymes help the newly positioned nucleotides bond at just the right atomic positions.

DNA repair systems also need detectors to surveil the integrity of chromosomes. Some detector proteins clamp on to DNA's double helix. They slide along a length of DNA to make sure all the nucleotides still fit right, like a hand feeling the inside of a bicycle tire for thorns. A nucleotide mismatch is one type of DNA damage that forms a bulge. When the detector finds it, it stops and sends a signal to recruit the right tools to repair the section.

Other sensors send electrons around a loop of DNA in a process called charge transport (CT) that detects base-pair mismatches or other anomalies.[4] CT uses various proteins to signal "one another to search cooperatively for damage in the genome."[5] This suite of connectable enzymes came preprogrammed to interpret the failed return of a delivered electron as an indication of DNA damage within each section of DNA it tests. The speed of an electron travelling along DNA makes this a remarkably efficient method of detecting lesions, or harmful structural changes.

Speaking of electrons, a completely different repair strategy reflects yet more of the Creator's wisdom. When chemicals called free radicals rob an electron from one part of DNA, other electrons slide into that now-vacant slot. Electrons that keep sliding along the DNA strand to fill a moving void would soon cause an unwanted chemical reaction if not for an ingenious, baked-in solution. Jesus placed sequences of guanine-cytosine pairs just outside important protein-coding regions. These outside guanines absorb the chemical harm while the coding regions stay perfectly intact.[6] These guanines are in just the right places to absorb the loss of electrons from nearby nucleotides.

Diligent research has revealed even more clever solutions to specific DNA troubles. The nucleotide excision repair (NER) pathway is the simplest of the 12 DNA repair pathways studied thus far. NER uses 30 proteins, including five enzymes, to snip out and replace sections that have, for example, abnormally bonded thymine bases called thymine-thymine dimers.[7] UV radiation causes neighboring thymine nucleotides to bind directly to one another. Dimers interfere with DNA replication (when cells divide) and DNA transcription (when DNA templates are copied to messenger RNAs). The cell would cease to function without NER.

A unique enzyme called photolyase can also repair thymine-thymine dimers. It clamps onto the dimer and collects a photon of blue light. Then it transfers that light energy to the offensive dimer to break it back into two separate thymines.[8] Clearly, the Lord Jesus considered and took care of all life's details from the very beginning.

Neo-Darwinism holds that mutations help drive evolution, but over 1,000 researchers publicly disagreed with this model when they signed "A Scientific Dissent from Darwinism."[9] One reason why experts aren't persuaded by neo-Darwinism is that DNA repair systems prevent the very mutations the evolutionary model requires. Some have called this the mutation protection paradox.[10]

DNA repair pathways and DNA itself make an all-or-nothing system.

DNA repair also presents a chicken and egg problem. Which came first—the DNA that stores the blueprints for dozens of required DNA repair proteins or the DNA repair proteins that are required to maintain DNA? Clearly, they must have been created at the same time. They arose when "He spoke, and it was done; He commanded, and it stood fast" (Psalm 33:9).

These Darwinian problems disappear if the Lord indeed created "the earth, the sea, and all that is in them" (Exodus 20:11). Natural causes cannot overcome the mutation protection paradox, the DNA-DNA repair dilemma, or the clever craftsmanship and foresight seen in DNA repair enzymes. Therefore, we ought to look to a supernatural cause. "All things were made through Him" who exists apart from creation (John 1:3). DNA repair systems point to a Creator with the same wisdom and lovingkindness that belong to the Lord Jesus Christ.

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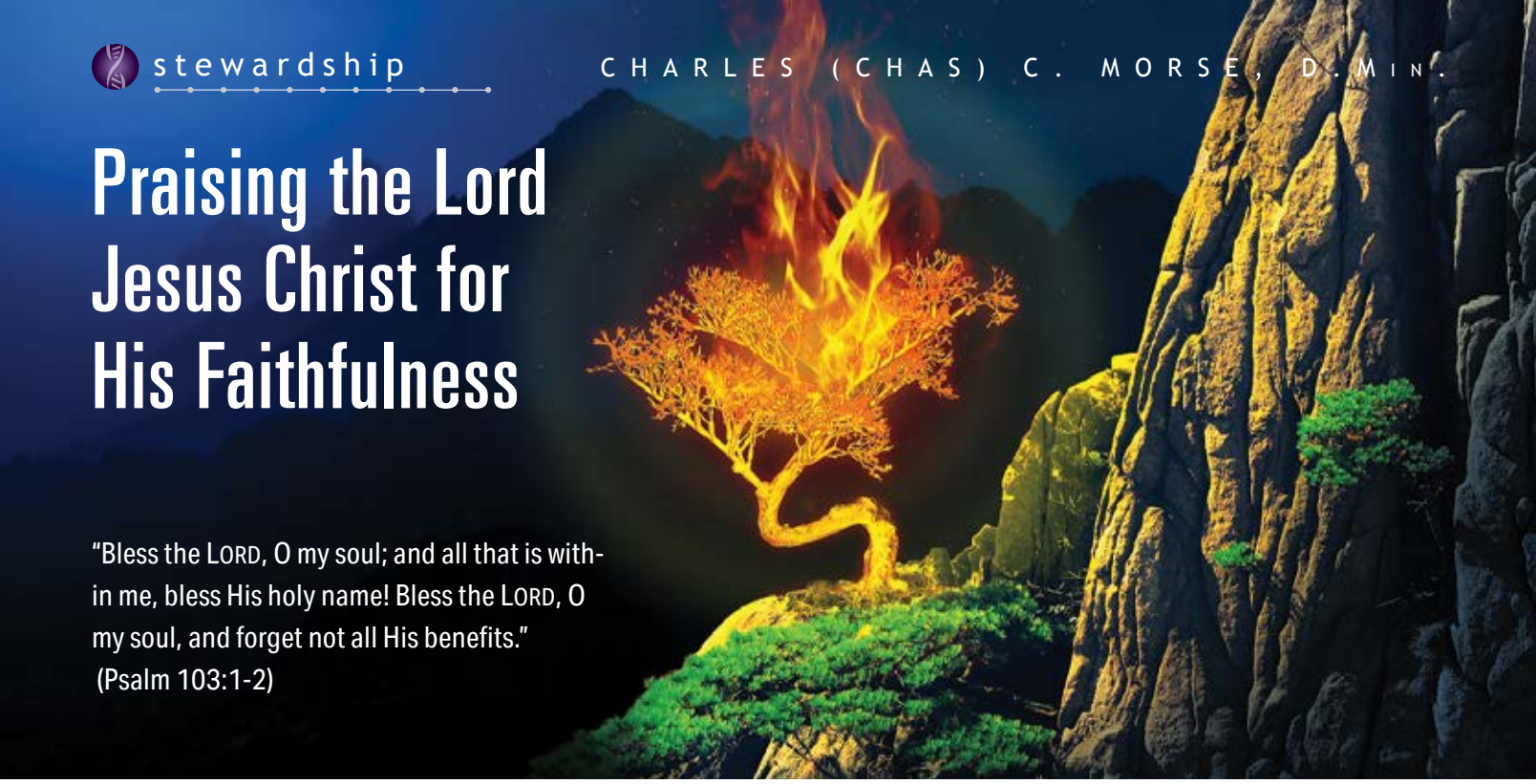
CHARLES (CHAS) C. MORSE, D.MIN.

Praising the Lord Jesus Christ for His Faithfulness



"Bless the LORD, O my soul; and all that is within me, bless His holy name! Bless the LORD, O my soul, and forget not all His benefits." (Psalm 103:1-2)

Psalm 103 is solely written for worship. It is pure unadulterated praise from start to finish. The capstone verse is "the LORD is merciful and gracious, slow to anger, and abounding in mercy" (v. 8). David's focus is riveted on one person—the LORD, the great I Am. So, why should we praise God today, especially witnessing all of the effects of a fallen creation? The answer is found in the name of God, the Lord Jesus Christ.

Interestingly, the very names of God included in the Bible identify the range of God's magnanimous character. In fact, the covenant name LORD is related to the verb "to be" and speaks of God's self-existence. In the New Testament, the religious leaders of Jesus' day questioned Him concerning His identity. Jesus answered their unbelieving queries by saying, "Most assuredly, I say to you, before Abraham was, I AM" (John 8:58). He existed before eternity as the LORD, the great I Am.

There is now a greater title reserved for our Lord Jesus Christ. "Therefore God also has highly exalted Him and given Him the name which is above every name, that at the name of Jesus every knee should bow, of those in heaven, and of those on earth, and of those under the earth, and that every tongue should confess that Jesus Christ is Lord, to the glory of God the Father" (Philippians 2:9–11).

As we begin 2024, the Institute for Creation Research gives thanks to our faithful Creator. We seek to glorify Jesus Christ by emphasizing the credit He is due as Creator and Savior. His goodness is displayed to all who seek after Him. We also see His faithfulness as the Lord Jesus Christ continues to bless ICR's research through faithful partners like you. Your support is vital to everything we do, and we use your gifts of love to feed souls with the truth of biblical creation.

This year, we're continuing to host Meet and Greets across the United States. I look forward to interacting with longtime supporters and new partners interested in this critical biblical creation ministry. What a blessing it is for me to personally thank all of you for your support as well as get to know you and share behind-the-scenes information on ICR's vision for the future. I invite you to join me when I come to your area.

May I ask you to please remember ICR in your prayers and financial giving? Our priority in researching continuous environmental tracking is already bearing fruit. Your prayers and gifts are a special blessing to us, ensuring this exciting research initiative blooms into the full glory that is rightly due our Creator (Revelation 4:11).

Dr. Morse is Director of Donor Relations at the Institute for Creation Research and earned his D.Min. from The Master's Seminary.

UPCOMING MEET AND GREET EVENTS

Free event • registration required • limited seating

January 27-28—Grace Lutheran Church, Naples, FL
February 25—Grace Fellowship Church, Overland Park, KS
March 10—Kimberly Christian Church, Kimberly, ID

For more information, email **ICRmeetandgreet@icr.org**

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JAMES J. S. JOHNSON, J.D., TH.D.

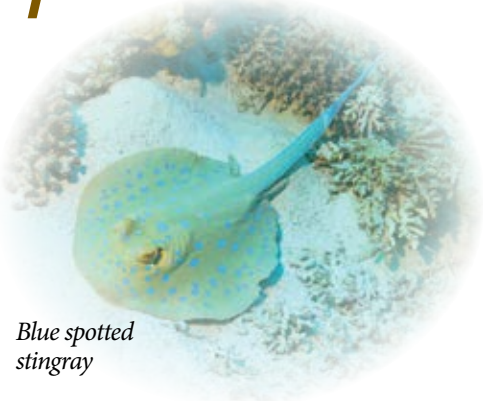
How Did Stingrays Get Fossilized in Wyoming?

Beavers shouldn't talk to humans. That obvious fact was highlighted in the movie adaptation of C. S. Lewis' classic fantasy *The Lion, the Witch, and the Wardrobe*.[1] Fairly early in the film, the four Pevensie siblings meet a beaver that talks to them. Oldest brother Peter says the beaver claims to know a certain faun. Oldest sister Susan replies, "He's a beaver! He shouldn't be saying anything!"

If something doesn't make sense—like a talking beaver—that might indicate that a story is just fiction. And when the tale told is an evolutionary story, it doesn't make sense because it's just science fiction.

One example of such science fiction is the evolutionists' efforts to explain the fossils found at Wyoming's Fossil Butte National Monument, an astonishing fossil graveyard administered by the National Park Service. The unusual biodiversity of fossils doesn't make sense if one assumes evolutionary stories. Rather, the physical evidence provides many provenance details for paleontologists to speculate and quarrel about.

The obvious "in your face" issue for any evolutionary paleontologist is this: These fossils memorialize *clearly recognizable animals*. But they shouldn't be recognizable as anything! Animals with fragile body parts (like damselflies, crickets, and wolf spiders) are so delicate that when they die in the wild, they disintegrate or are eaten quickly and soon disappear.[2,3]



Blue spotted stingray

It's also amazing that certain oceanic creatures, like stingrays, were buried in Wyoming so quickly and tightly that their body shapes didn't disintegrate before fossilization.

> Like sharks, sting rays have a skeleton composed of cartilage. Normally, cartilage is not preserved as a fossil as it disintegrates readily. The excellent skeletons of *Xiphotrygon* are good evidence of how well the shales of the Green River Formation preserve the fossils.[4]

> Fossils are found as billions of dead things, buried in rock layers, laid down by water, all over the earth. All scientists agree that floods are the ideal conditions for forming fossils. When a plant or animal is rapidly and deeply buried in cement-rich sediment, the deep burial keeps the specimen from being totally destroyed by things like scavengers or wind or water currents, and the mineral cement hardens the material to preserve.…Dead things are broken down so fast [think vultures] that most fossils must have formed rapidly or they wouldn't have formed [as recognizable fossils] at all.[2]

Stingray fossil from the Green River Formation in Wyoming

The multifarious mix of fossilized "graveyard" remains at the Fossil Butte National Monument consists of more oceanic animals than just stingrays and is jumbled together with terrestrial animals such as insects (dragonflies, damselflies, beetles, crickets, flies, bees, ants); various spiders; birds (frigatebirds, ground fowl, roller birds); finfish and shellfish (penaeid shrimp, ostracod shrimp, crayfish or lobsters, oceanic stingrays, sandfish, catfish, perches, paddlefish, shads, oceanic herrings, sardines); mammals (bats, squirrels, horses, tapirs); reptiles (alligators, anoles, other lizards, snakes, various turtles); amphibians (salamanders, frogs); gastropods (*Turritella* sea snails, freshwater snails); bivalves (mussels, clams); and more.[3]

Aside from their great preservation, how can so many oceanic animals like stingrays get buried with land animals inside the Rocky Mountains in Wyoming instead of along some ocean beach? "It's an oceanic stingray! It shouldn't be there."

Only the worldwide Genesis Flood makes sense of these fossils. If there had been no global Flood, those animal fossils *shouldn't exist at all*, much less be recognizable animals. So, just as a cairn of stones once served as a memorial monument (see Joshua 4:1–9), the fossils of Wyoming's Fossil Butte National Monument now comprise a paleontological memorial to the fossil-forming Genesis Flood.

article highlights

- Fossils abound in the sedimentary rock layers of Wyoming's Fossil Butte National Monument, including ones of fragile creatures like spiders, crickets, birds, and stingrays.
- The mix of land and marine fossils in this area is astounding since sea creatures shouldn't be that far inland.
- Virtually all fossils require a watery catastrophe in order to form.
- The sudden entombment of billions of creatures all over the world—literally buried alive—points directly to the global Flood described in Genesis.

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4. Fossil Butte: The Geologic History of Fossil Butte National Monument and Fossil Basin. NPS Occasional Paper No. 3. National Park Service. Posted on npshistory.com, last updated March 1, 2005.

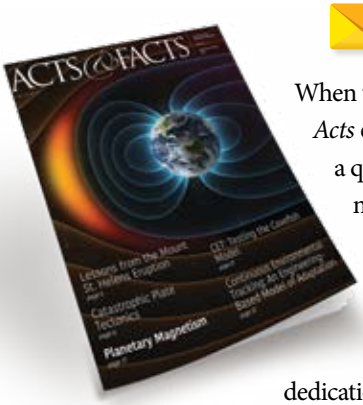
Dr. Johnson is Associate Professor of Apologetics and Chief Academic Officer at the Institute for Creation Research.

My wife and I have always been encouraged by your scientific work in support of biblical truth. We anxiously await the arrival of *Acts & Facts* and are excited by the updates regarding future research that ICR will be conducting. We are in retirement years, and the time frame and amount of our giving is limited. **Please use this gift in any area that would help ICR.** We just wish it could be more. God bless the entire ICR team.

— R. & K. C.

My husband and I recently visited the [ICR] Discovery Center.…**It was the highlight of our trip to be able to stop and see your facility.** [A scientist showed us] the recent research on the blind cavefish—it was fascinating! My husband read his article in *Acts & Facts*, so he was able to converse with him about this study. Please thank him for the time he spent with us, and thank you to everyone who is using his/her gifts to further explore the intricates of God's marvelous creation. We…purchased some wonderful books for ourselves and for our grandchildren!

— D. C.



When the [Research Edition 2023] *Acts & Facts* arrived the other day, a quick review of the titles made my heart race with excitement. I was…about 2/3rds of the way through the publication and decided to sit down to say thank you to you all for all your dedication and hard work over the years! **I came to creationism and was delivered out of evolution brainwashing…when a friend showed me your RATE [Radioisotopes and the Age of the Earth] results, which are irrefutable!** I had to truly be washed [in] the truth and still to this day crave to know more as your research brings the FACTS to life!

— H. P.

I just want to express my appreciation to all the staff and volunteers we came in contact with when visiting [the ICR Discovery Center] on September 12 and 13. Everyone was extremely attentive and helpful during our visit. We spent the better part of two days there and could have spent more time. **I was very impressed by all the video screens placed along the way and had [the] chance to visit several places on each video screen. There was an unbelievable amount of information presented, and we appreciated it so very much.** I continue to support ICR and all the work you do reinforcing creation, the new earth, and so much more.

— A. B.

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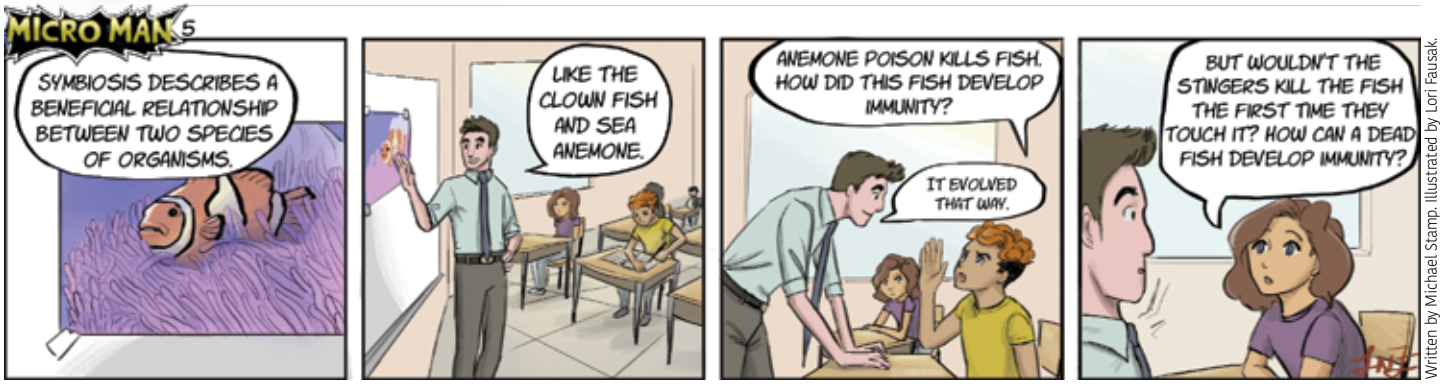
MICRO MAN 5
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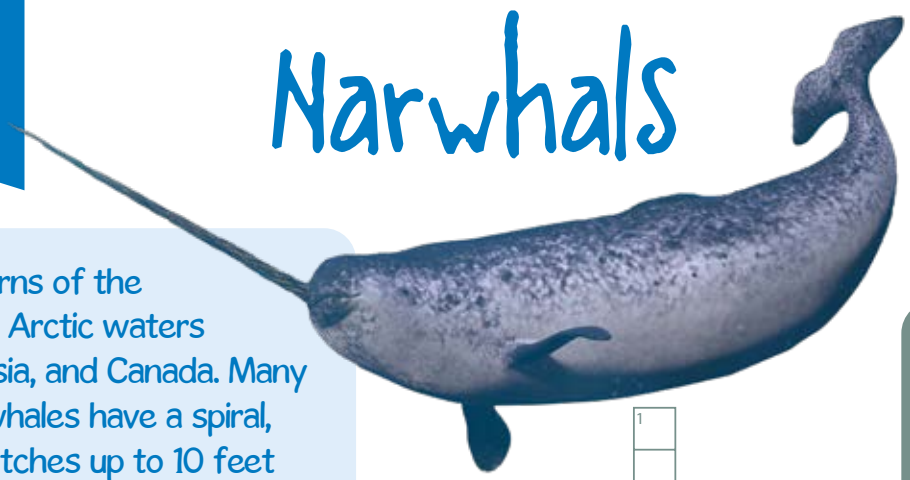
LIKE THE CLOWN FISH AND SEA ANEMONE.
ANEMONE POISON KILLS FISH. HOW DID THIS FISH DEVELOP IMMUNITY?
IT EVOLVED THAT WAY.
BUT WOULDN'T THE STINGERS KILL THE FISH THE FIRST TIME THEY TOUCH IT? HOW CAN A DEAD FISH DEVELOP IMMUNITY?

Written by Michael Stamp. Illustrated by Lori Fausak.

Creation Kids

Narwhals



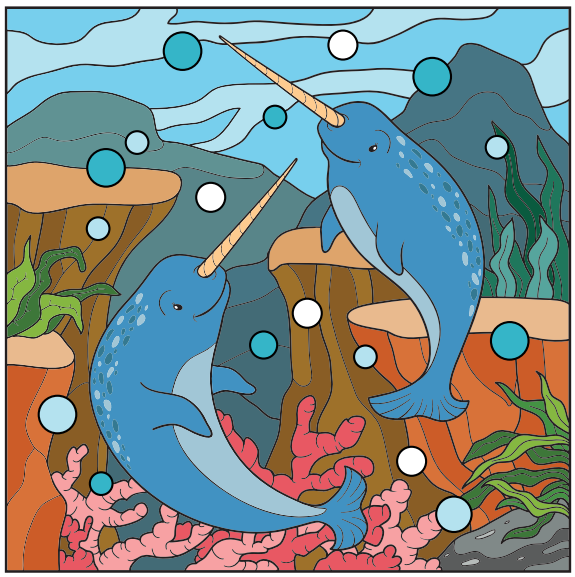
Known as the "unicorns of the sea," narwhals live in Arctic waters near Greenland, Russia, and Canada. Many of these incredible whales have a spiral, hollow tusk that stretches up to 10 feet long. But did you know that it's actually a gigantic tooth? In His creativity, the Lord Jesus made all the ex-sea-llent things we love about narwhals! Did you also know...

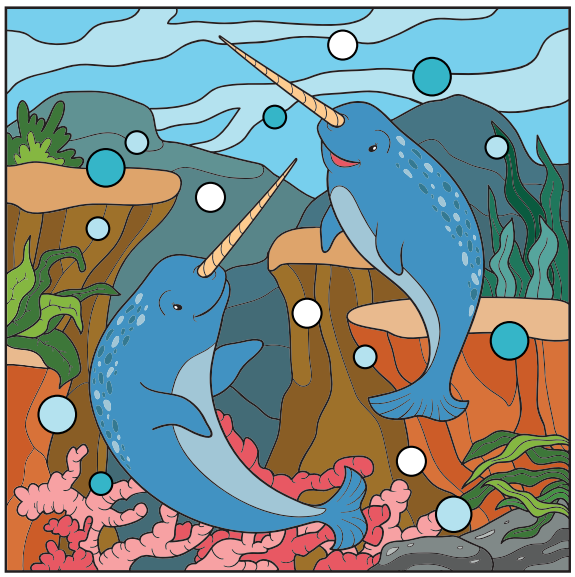
- ✔ Narwhals have a thick layer of fat called blubber that keeps them warm.
- ✔ To navigate the oceans, narwhals make sounds that bounce off nearby objects. This technique is known as echolocation.
- ✔ Scientists think narwhals use their ivory tusks to track changes in the environment.
- ✔ As social animals, narwhals like to swim together. The largest groups have thousands of them!

Did you know?

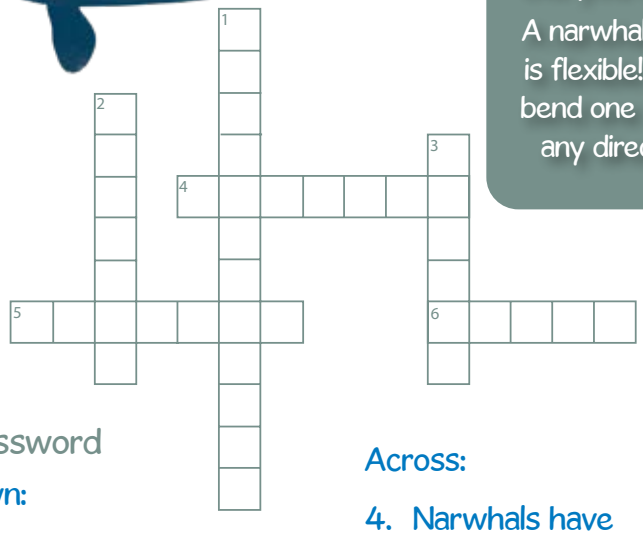
A narwhal's tusk is flexible! It can bend one foot in any direction.

Circle 10 differences in the pictures below.





Crossword



Across:

4. Narwhals have _____ to stay warm.
5. A _____ is a type of whale and has a tusk.
6. The tusk of a narwhal is made of _____.

Down:

1. _____ is how animals find things using sound.
2. A _____ is a mythical horse with one horn.
3. Narwhals live in _____ waters.

Fill in the Blanks

"Let _____

and _____

praise Him, the

_____ and

_____

that moves in them."

(Psalm 69:34)

Answers to Crossword: Down: 1. echolocation, 2. unicorn, 3. Arctic; Across: 4. blubber, 5. narwhal, 6. ivory. Answers to Fill in the Blanks: heaven, earth, seas, everything

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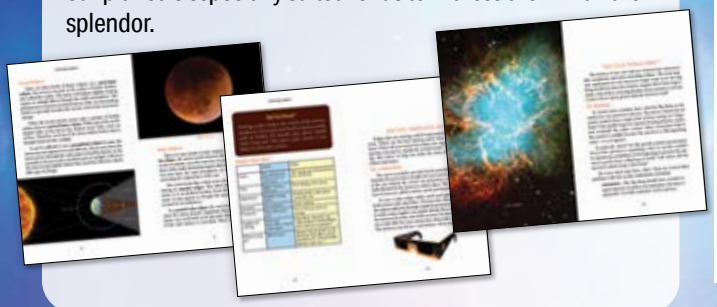

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